REMARKS/ARGUMENTS

Favorable reconsideration of this application is requested in view of the above amendments and in light of the following remarks and discussion.

Claims 1-8 are pending in the application, Claim 8 having been newly added by the present amendment.

In the outstanding Office Action, Claims 1-7 were rejected under 35 U.S.C. §103(a) as being unpatentable over Beatty et al. (U.S. Patent 6,692,249).

Claim 8 has been newly added herein. Claim 8 is believed to find support in the specification, claims and drawings as originally filed, and thus no new matter is believed to be added thereby. If, however, the Examiner disagrees, the Examiner is invited to telephone the undersigned who will be happy to work in a joint effort to derive mutually satisfactory claim language.

Briefly recapitulating, Claim 1 of the present invention is directed to an outer tube and the outer tube is made of silicon carbide and has an upper portion closed and a lower portion opened, has the lower portion formed with a tapered portion so as to expand a diameter thereof toward a lower end thereof, and has a flange formed on an outer peripheral side of the lower portion. Furthermore, in the outer tube, the following conditions being met:1) a ratio of t_a/D_1 is from 0.0067 to 0.025, 2) a product of $t_a \times D_1$ is from 600 to 4,000 (mm^2), 3) $(D_{F2}-D_{F1}) \times t_c/(D_1 \times t_a)$ is from 0.1 to 0.7, and 4) L_1/L_2 is from 1 to 10; where the outer tube has a thickness of t_a (mm) and an inner diameter of D_1 (mm), the flange has a thickness of t_c (mm), an inner diameter of D_{F1} (mm) and an outer diameter of D_{F2} (mm), and the tapered portion has a height L_1 (mm) and an expanse of L_2 (mm). The outer tube is used in a thermal treatment system. By setting such conditions, the outer tube according to Claim 1 allows a

larger size in its diameter and exhibits better durability and improved isothermal heating zone.[1]

The outstanding Office Action asserts that "Beatty et al differs from the present invention in that Beatty et al. does not teach specific dimensions of the outer tube (i.e. size, radii of curvature, surface roughness, etc)," but "it would have been obvious ... to provide specific dimension from which to manufacture the apparatus of Beatty et al." Nevertheless, it is respectfully submitted that Beatty et al. does not teach or suggest "the following conditions being met:1) a ratio of t_a/D_1 is from 0.0067 to 0.025, 2) a product of $t_a \times D_1$ is from 600 to 4,000 (mm^2), 3) $(D_{F2}-D_{F1}) \times t_c/(D_1 \times t_a)$ is from 0.1 to 0.7, and 4) L_1/L_2 is from 1 to 10; where the outer tube has a thickness of t_a (mm) and an inner diameter of D_1 (mm), the flange has a thickness of t_c (mm), an inner diameter of D_{F1} (mm) and an outer diameter of D_{F2} (mm), and the tapered portion has a height L_1 (mm) and an expanse of L_2 (mm)" as recited in Claim 1. That is, Beatty et al. does not recognize the claimed parameters such as the "ratio of t_a/D_1" and "product of $t_a \times D_1$" which are relevant to the amount of thermal transfer and mechanical strength at a certain portion of the outer tube, *i.e.*, location A.[2] Nor does Beatty et al. recognize the other parameters such as the "$(D_{F2}-D_{F1}) \times t_c/(D_1 \times t_a)$" and "$L_1/L_2$" which are relevant in decreasing bending stress and thermal stress at the locations B and C of the outer tube.[3] Furthermore, nowhere does Beatty et al. describe how to improve mechanical strength and decrease bending and thermal stresses at certain portions of the outer tube 12. As such, even assuming, *arguendo*, that the dimensions of the outer tube 12 such as a size, radii of curvature, and surface roughness are obvious, Beatty et al. still fails to suggest that such dimensions be converted to certain mathematical expressions which can be utilized as

[1] See, for example, Specification, page 4, lines 12-17.
[2] See, for example, id., page 7, line 1, to page 8, line 2.
[3] See, for example, id., page 8, line 3, to page 10, line 9.

parameters to measure mechanical strength and bending and thermal stresses especially at certain portions of an outer tube. In addition, the conditions recited in Claim 1 further include numerical ranges in which the aforementioned advantages such as increase in mechanical strength and decreases in bending and thermal stresses are attributed. Thus, without the guidance of those recited mathematical expressions as parameters as discussed above, it is not believed that dimensions required simply to manufacture the Beatty et al. outer tube would be selected such that when the dimensions are converted, they would necessarily fall within one or any of those recited ranges. Therefore, it is respectfully submitted that the subject matter recited in Claim 1 is patentably distinguishable from Beatty et al., and because Beatty et al. fails to disclose the conditions as recited in Claim 1, its teachings are not believed to render the outer tube recited in Claim 1 obvious.

Likewise, Claims 4 and 8 are believed to include subject matter substantially similar to what is recited in Claim 1 to the extent discussed above. Thus, Claims 4 and 8 are also distinguishable from Beatty et al.

For the foregoing reasons, Claims 1, 4 and 8 are believed to be allowable. Furthermore, since Claims 2, 3 and 5-7 ultimately depend from either Claim 1 or 4, substantially the same arguments set forth above also apply to these dependent claims. Hence, Claims 2, 3, and 5-7 are believed to be allowable as well.

In view of the amendments and discussions presented above, Applicants respectfully submit that the present application is in condition for allowance, and an early action favorable to that effect is earnestly solicited.

Respectfully submitted,

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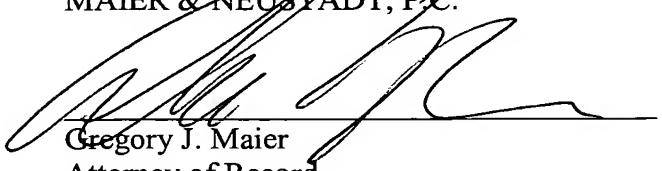

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